Duro-Bond®

Induction Welding System

User's
Manual 2011

Duro-Last® Roofing, Inc.
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The Duro-Bond® System

The Duro-Bond system is a mechanically-attached installation option for installing thermoplastic membranes to substrates, without penetrating the roofing system, using specially coated plates. The Duro-Bond system will allow both Centrix® and RhinoBond® welders to be used to attach the Duro-Last membrane to the induction plates.

The Duro-Bond system may ease the installation process by reducing some installation steps. The insulation and membrane do not have to be mechanically-attached in separate steps like traditional mechanically-attached systems. The induction plates are used to secure the insulation. The Duro-Last membrane is then welded to the surface of the installed induction plate. The induction plates are installed in pre-determined patterns, and the membrane is unrolled from carpet rolls, ready to begin the induction welding process.

The use of carpet rolls and fewer fasteners may ultimately save time and labor costs in the field.

All Duro-Last colors and warranties are available for this system. All Duro-Bond plates must be purchased through Duro-Last Roofing, Inc. to obtain the warranty. Refer to the mechanically-attached specifications for all Duro-Bond projects.

Thank you for using the Duro-Bond system for your induction welding needs. Please feel free to call the Duro-Last Engineering Services Department with any comments or concerns in regards to this system.

Duro-Last Roofing, Inc.

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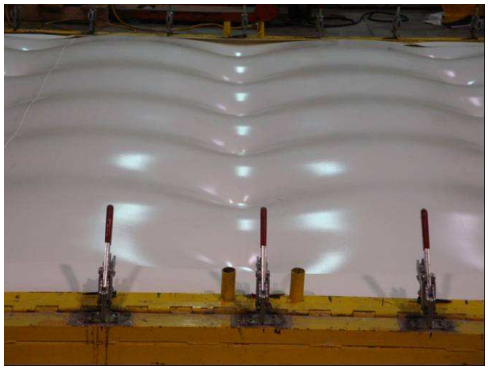
The Centrix Welder

Centrix Welder

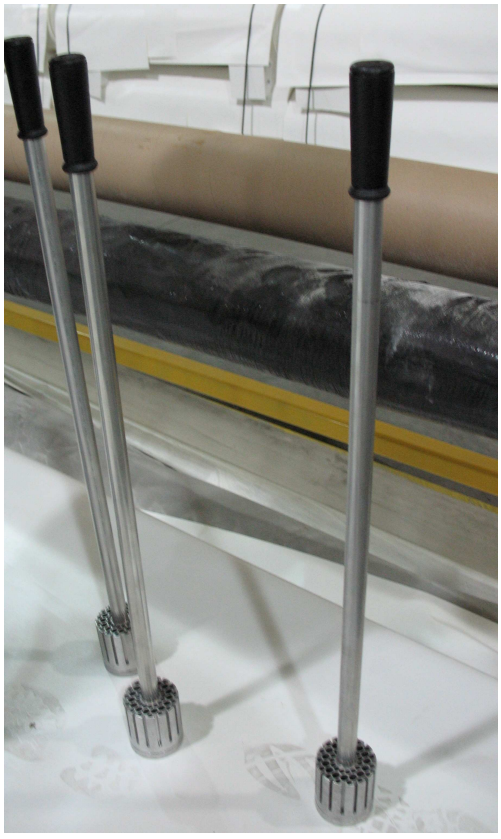
Centrix Magnet & Plate

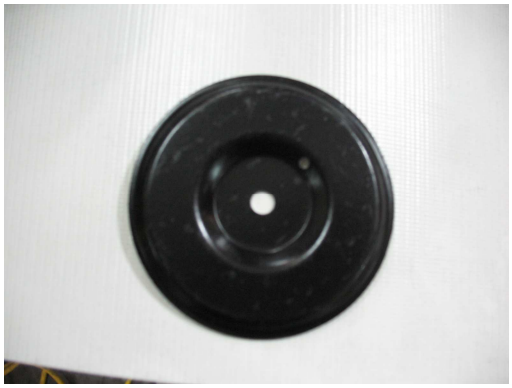


Installed Pattern

The RhinoBond Welder

RhinoBond Welder


RhinoBond Magnets


RhinoBond Plate

Installation

1. Lay insulation material into place and fasten with **Duro-Last #15 or concrete fasteners** and Duro-Bond plates per the required fastening pattern. Duro-Bond plates are to be driven until enough pressure is applied to keep from spinning. **DO NOT OVERDRIVE** fasteners (see detail 4 page 12). Fastening patterns are determined by pull test values and the required uplift pressure. Install plates in a uniformed pattern for ease of locating during welding process. For new construction or tear offs, plates must be installed on non-heat sensitive surfaces such as polyisocyanurate, DensDeck®, SP Insulfoam® or ACH Secure Therm®. On projects where a heat sensitive product is present (EPS/XPS,EPDM, DL approved Slip Sheets), the plates can be installed by placing Atlas FR-10® or 4" cutouts of Duro-Last material under the Duro-Bond plate.

2. Please review the operating precautions (pg.24) prior to starting the welding process.

3. Unroll the pre-fabricated no tab membrane over the installed plates and allow the membrane to relax to eliminate any wrinkles. If packaging wrinkles exist weld first row of plates along the long side at the building edge of the start panel or field seam of start panel for adjacent panel. Then use Gripull® to tighten membrane. Place Gripull (as shown in Figure A on pg. 24) and pull to remove large wrinkles. Do not over tighten membrane. Once the wrinkles are removed weld the last row of plates along the field seam. Once the roof panel is secured on minimum of two sides the adjacent roof panels can be installed. Locate the last row of roof panels so they are within 12" of the membrane edge.

4. Test welds must be completed to calibrate the welder settings. Recommended welder settings are starting points for test welds because the welding process is affected by ambient temperatures. Three or more test welds must be completed using scrap material and induction plates until full adhesion is achieved. The membrane should be fully welded to plate surface and peeled down using pliers to expose the adhesion. (see pg. 21 Test Weld Procedure)

5. Locate plates by rubbing the membrane with the sole of your shoe. Center welder over plate. DO NOT MOVE welder during cycle: this will cause bad or partial welds. Once weld is complete place magnets on plate to finalize the bonding process. Once all supplied magnets have been applied then re-use the first magnet and repeat cycle.

6. All Duro-Bond plates must be mechanically attached to the substrate and welded to the membrane. 100% adhesion must be achieved.

7. Welds can be tested after Duro-Bond plates have cooled to the touch by placing approved plunger next to the plate and lifting up on the plunger. A bonded plate will create a crease in the membrane; an un-bonded plate will have membrane lift up from plate. Mark any partial or un-bonded plate & return when cool to touch to re-weld. If 100% adhesion is not achieved on second weld attempt then replace plate, weld and patch membrane.

8. It is very important to keep magnets clean from metal shavings and debris. Clean off magnets and roof sections regularly to avoid embedment into membrane.

Recommended Welder Settings

Centrix

40 mil = 4.2 sec
50 mil = 4.2sec
60 mil = 4.4 sec

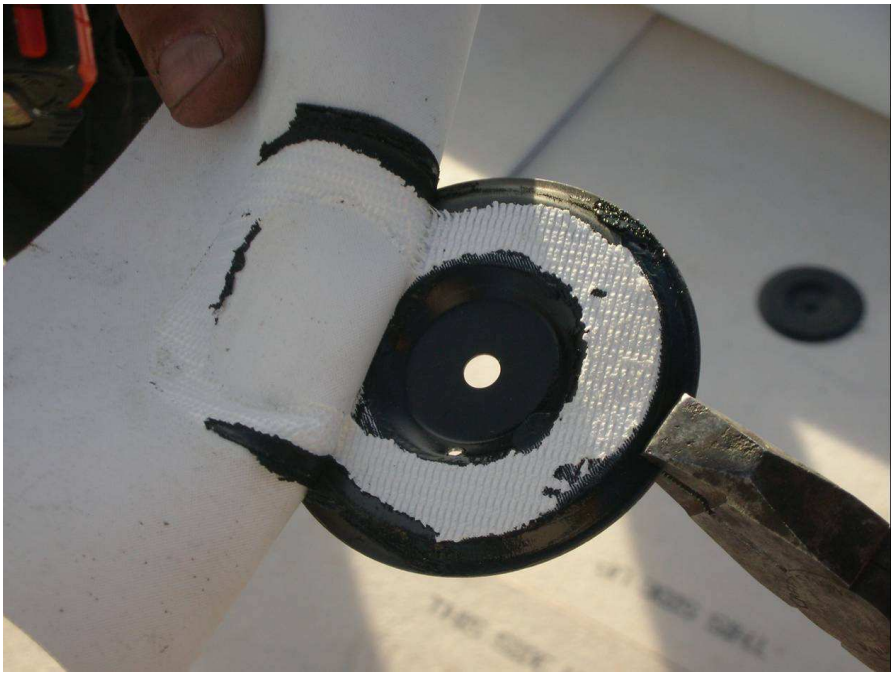
Note: If 100% adhesion is not achieved then adjust welder settings by 0.2 sec. up or down until optimum setting is achieved

**** See welder manufacturer operation manual for welder adjustments**

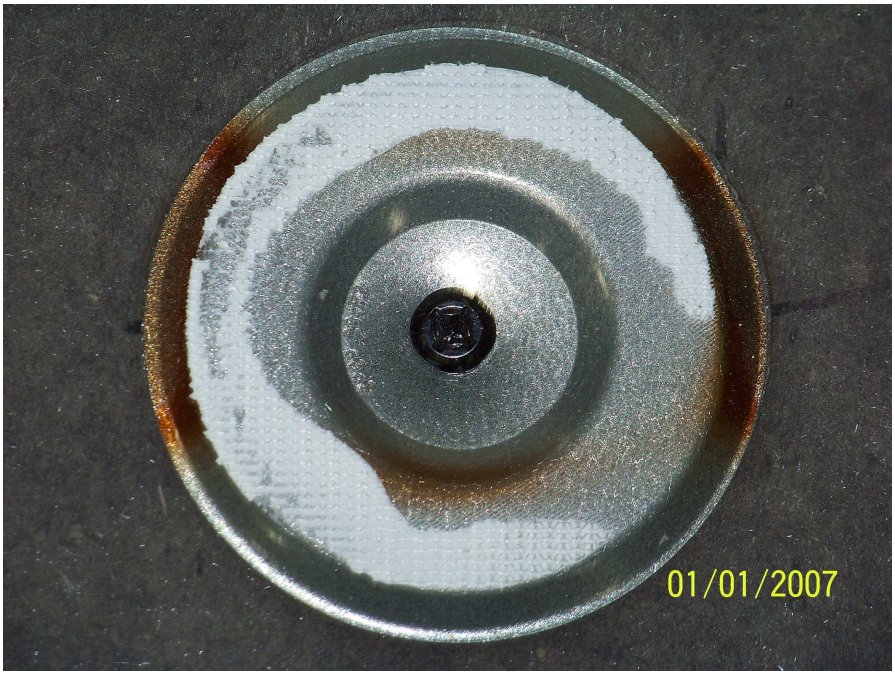
Rhino Bond

The energy level must be adjusted up (+1, +2, etc.) when temperatures are below 70 degrees F, and down (-1,-2, etc.) when temperatures are above 70 degrees F.

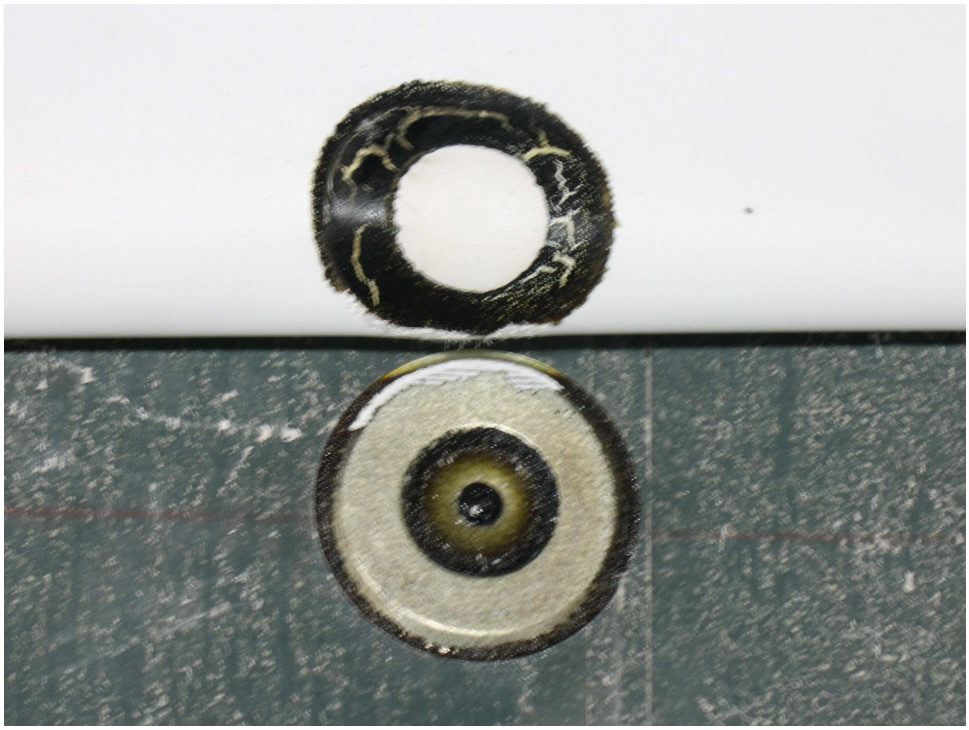
Examples



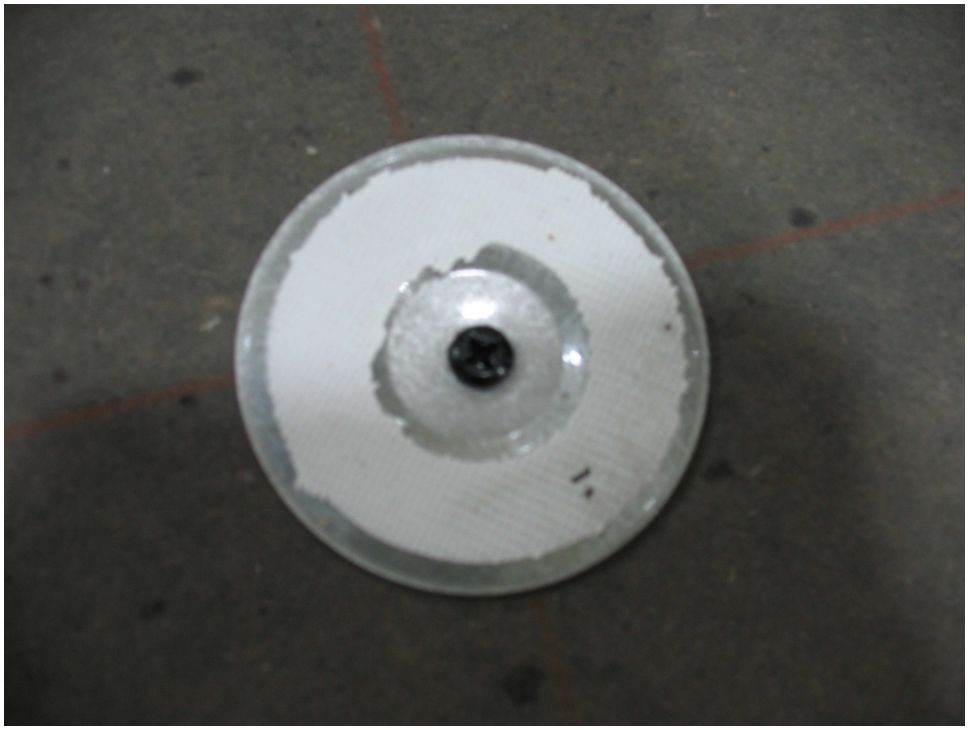
Test Pull



Partial Weld

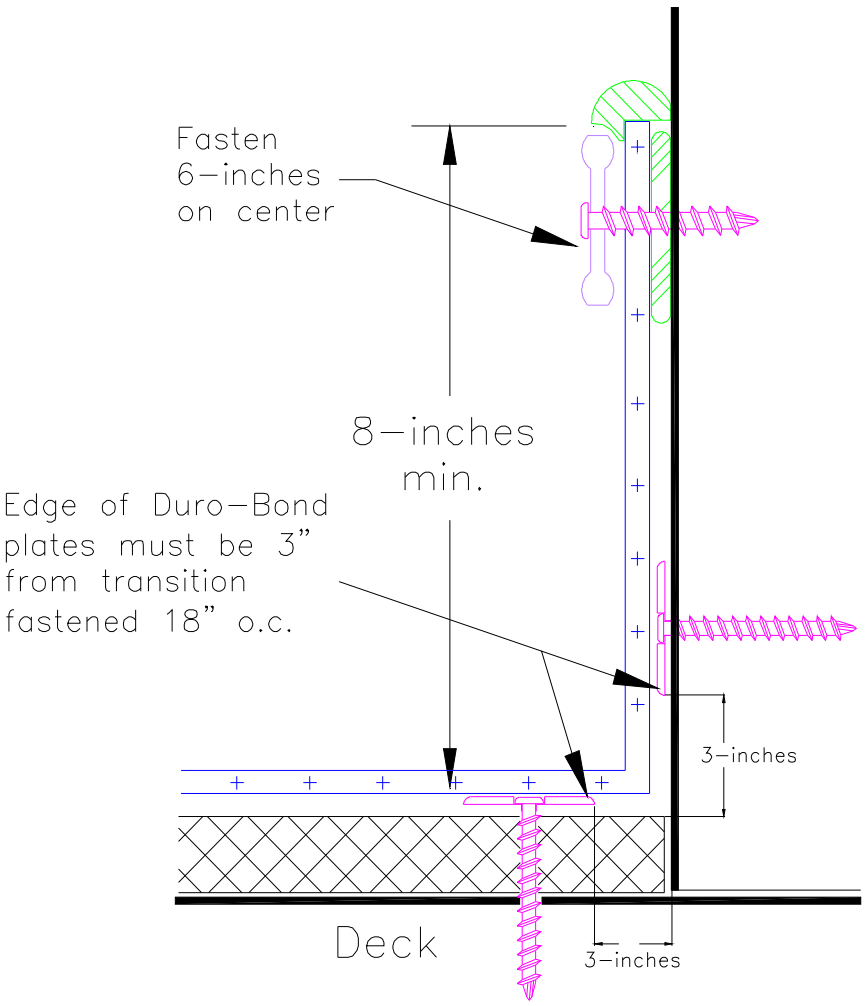


Excessive Heat (Bad Weld)



Good Weld (100% Adhesion)

Details

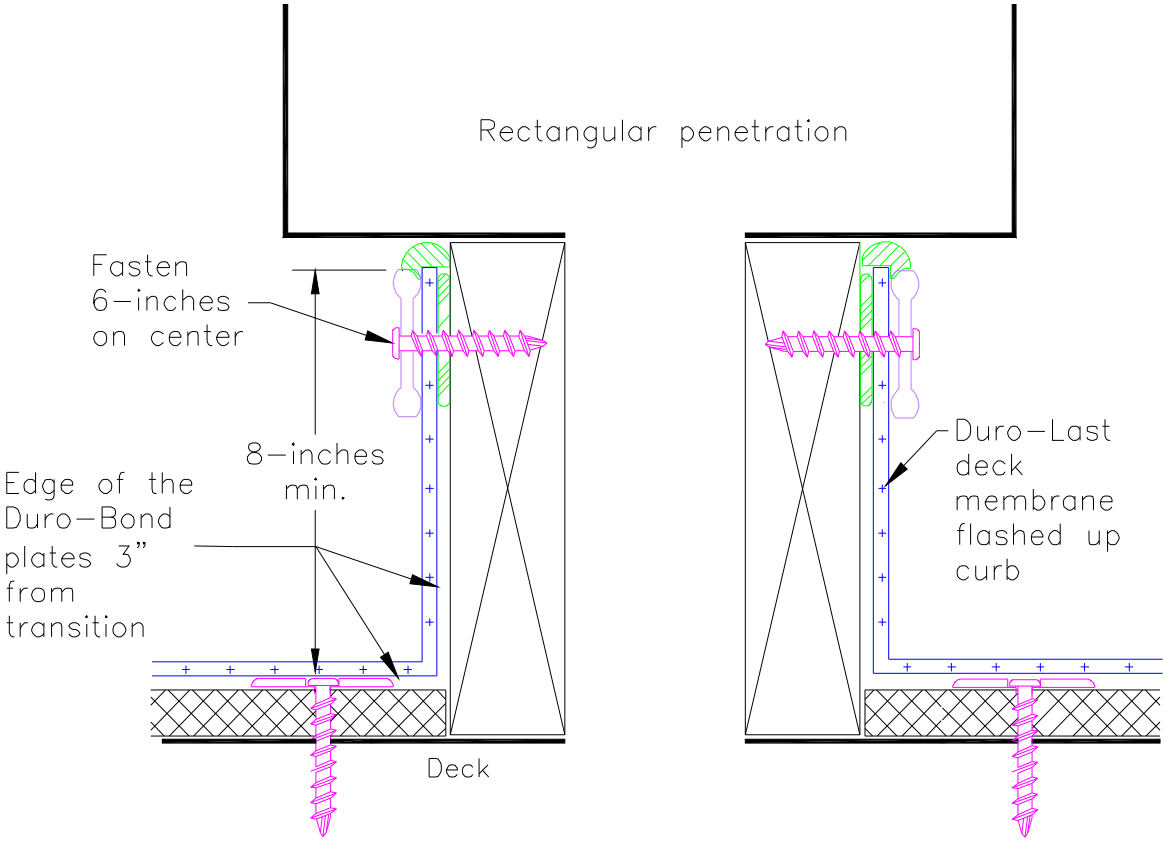


Note 1: Fascia bar and cover may be used in place of the termination bar.

Note 2: The substrate must be free and clear of debris at and below the termination point.

Note 3: When attaching the parapet flashing to the substrate, the appropriate fastener must be used. The fastener for the wall flashing may be different than the fastener used on the horizontal roof decking.

1 NTS — INSIDE WALL TERMINATION
New Construction or Reroof

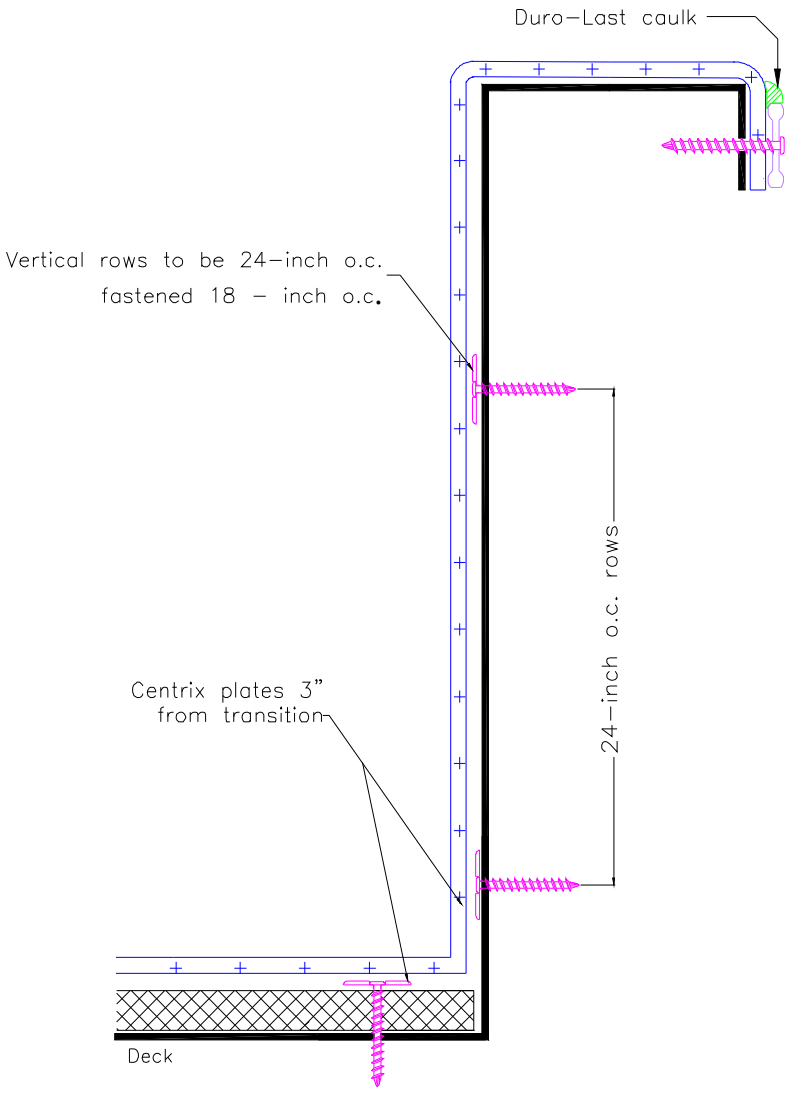


Note 1: Perimeter fastening of the deck membrane will be the same fastening pattern as the field membrane, max. 18–inches on center, and no less than one fastener per side.

Note 2: All termination bar to have a fastener 1–inch max. from each corner.

Note 3: Outside corners must be used with this detail

2 NTS — RECTANGULAR PENETRATION
New Construction or Reroof



Note 1: Fascia bar and cover may be used in place of termination bar.

Note 2: When attaching the parapet flashing to the substrate, the appropriate fastener must be used. The fastener for the wall flashing may be different than the fastener used on the horizontal roof decking.

Note 3: If top of wall is less than 30" from a row of fasteners then material can be wrapped over and terminated

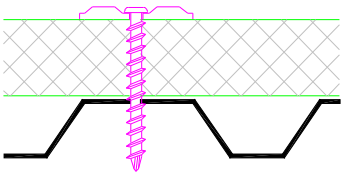
3 NTS

OUTSIDE WALL TERMINATION

New Construction or Reroof

CORRECT

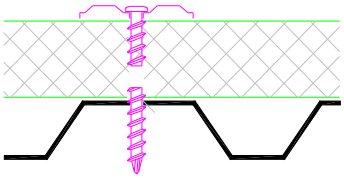
Fastener driven perpendicular.



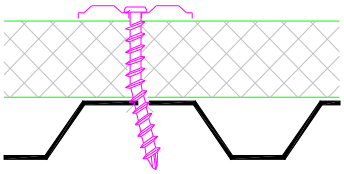
Note:
Duro-Last will accept fasteners penetrating through the bottom of a flute in metal decks. Be sure that the fasteners penetrate the metal by at least 1-inch.

INCORRECT

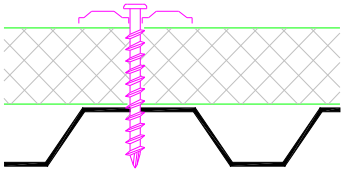
Fastener snapped.



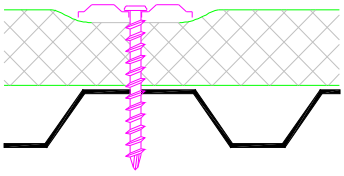
Fastener bent.



Fastener underdriven.



Fastener overdriven.



Fastener driven at an angle.

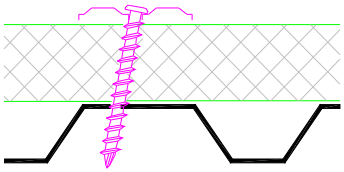
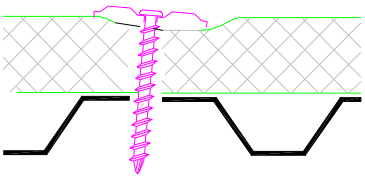


Plate on angle & overdriven.



4
NTS

INDUCTION PLATE FASTENING

New Construction or Reroof

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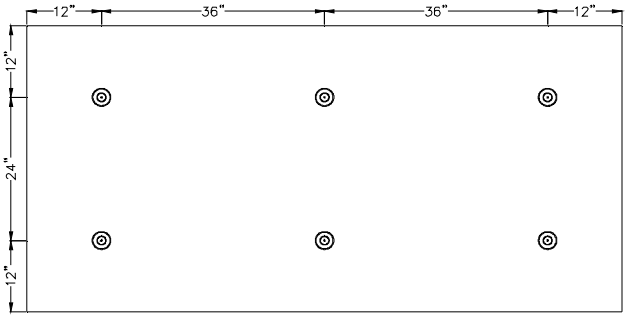
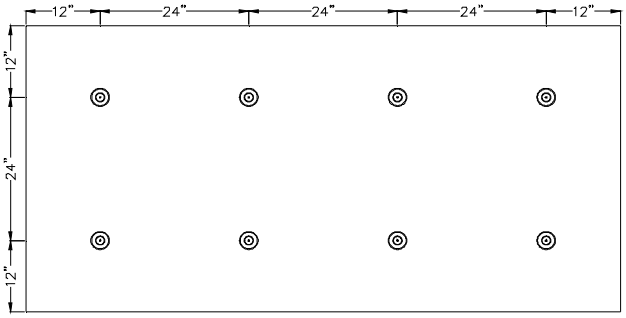
Induction Plate Fastening

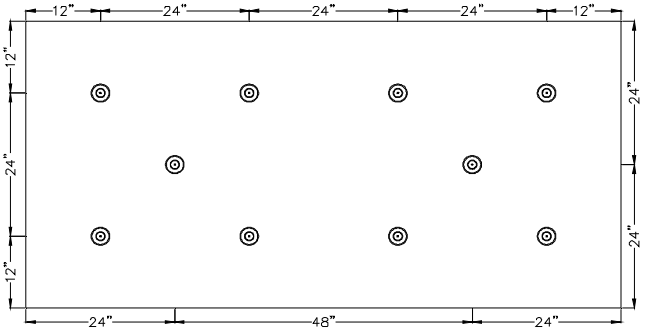
Induction Plate Fastening
4' x 8' Insulation Boards



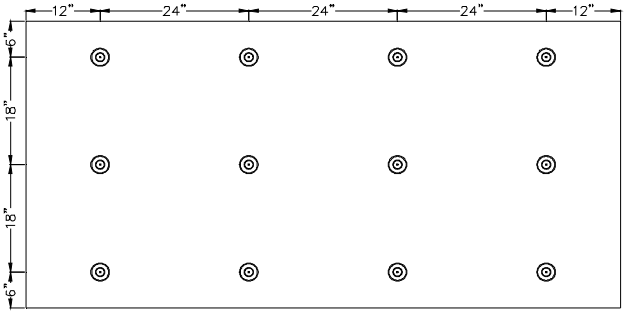
6 Plates



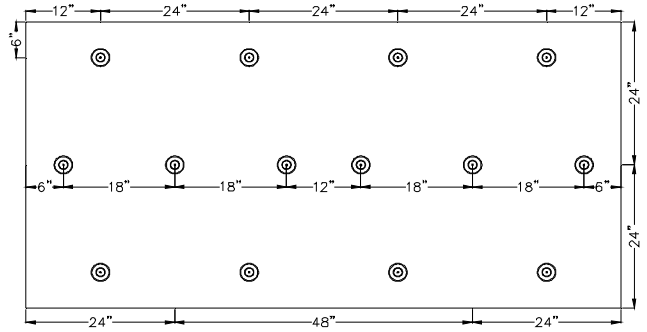
8 Plates



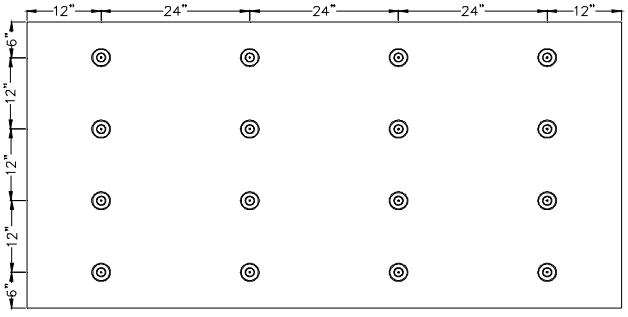
10 Plates



12 Plates

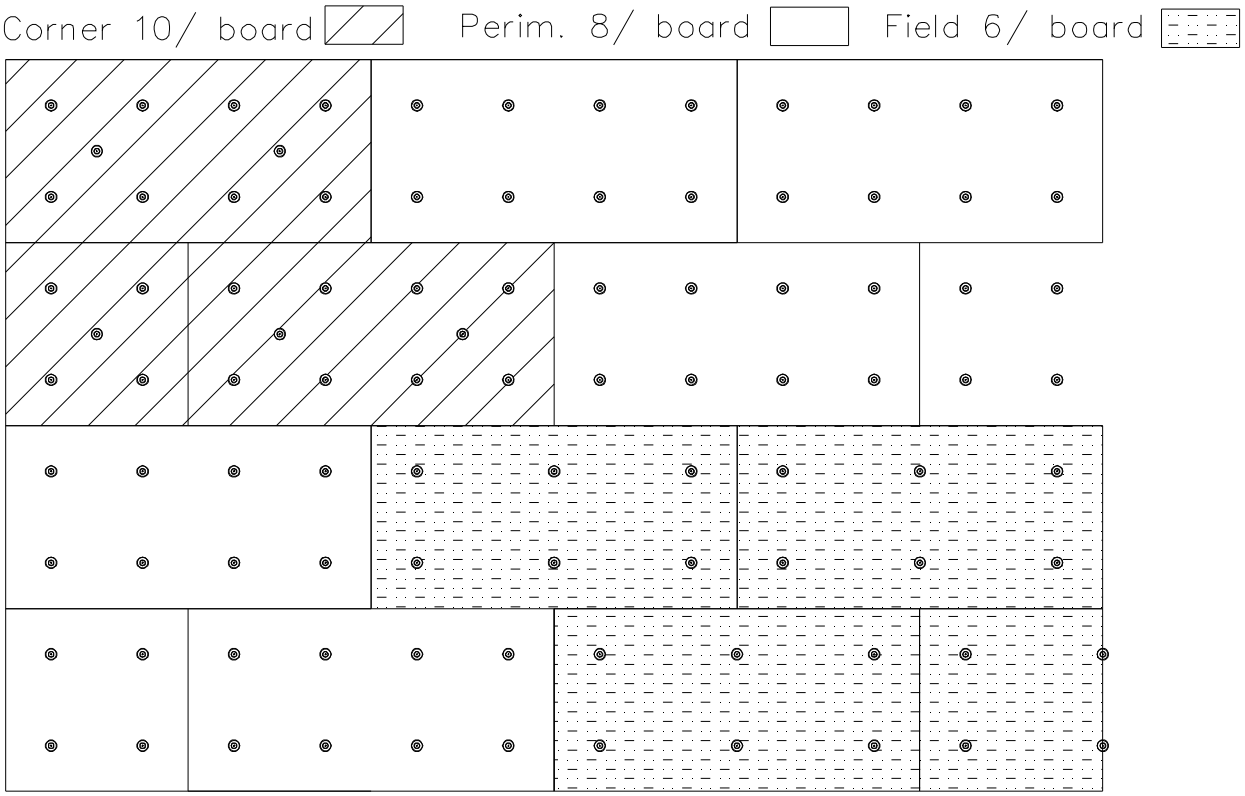


14 Plates



16 Plates

Typical insulation installation



All warranted projects must have induction plates purchased through Duro-Last Roofing, Inc.

Material Limitations

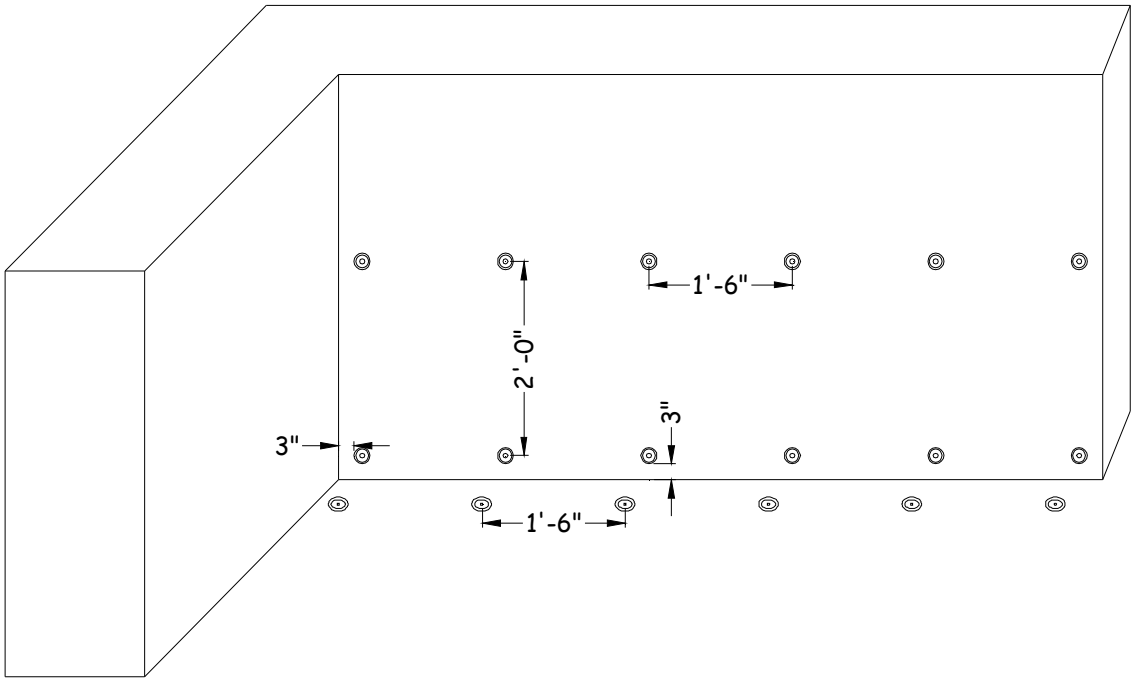
Material	Sq.Ft.	Carpet Rolls
40 mil	2,500	100' x 25' max.
50 mil	2,000	80' x 25' max.
60 mil	1,500	60' x 25' max.

Parapet Fastening

There are three options for attaching parapets with induction welding system. Plates and fasteners shall be no more than 3-inches from all transitions.

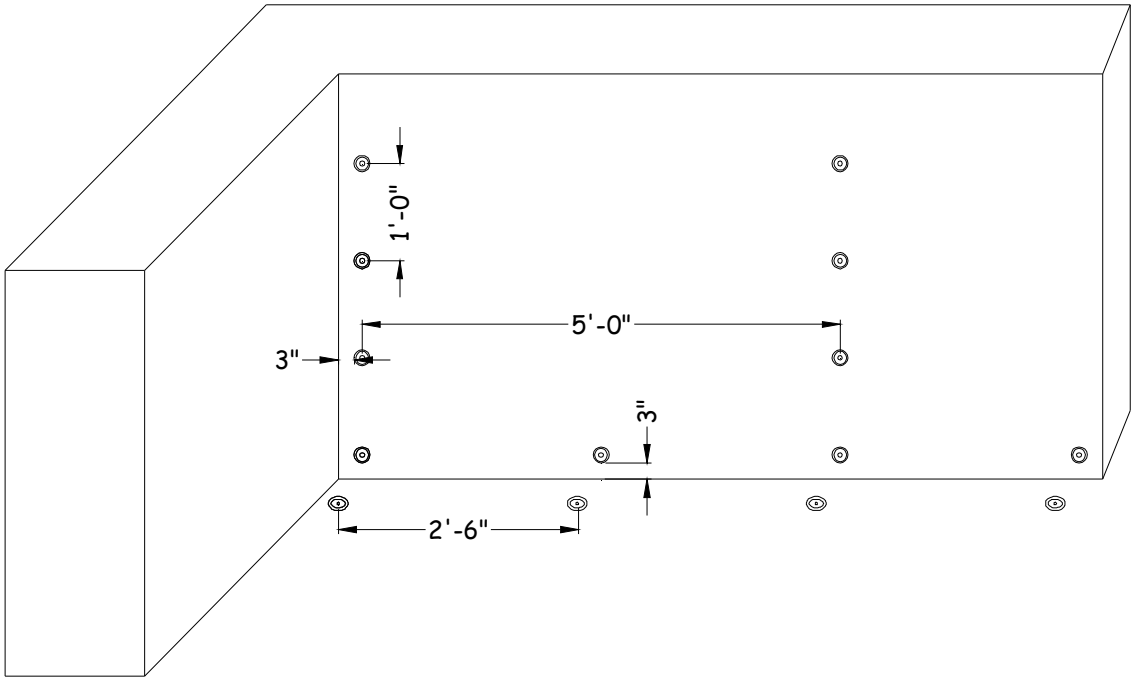
(Option 1)

Rows of fasteners shall be 24-inches on center vertically unless the last row falls 30-inches or less from the top of the wall. Then material can be terminated or wrapped up and over to outside.



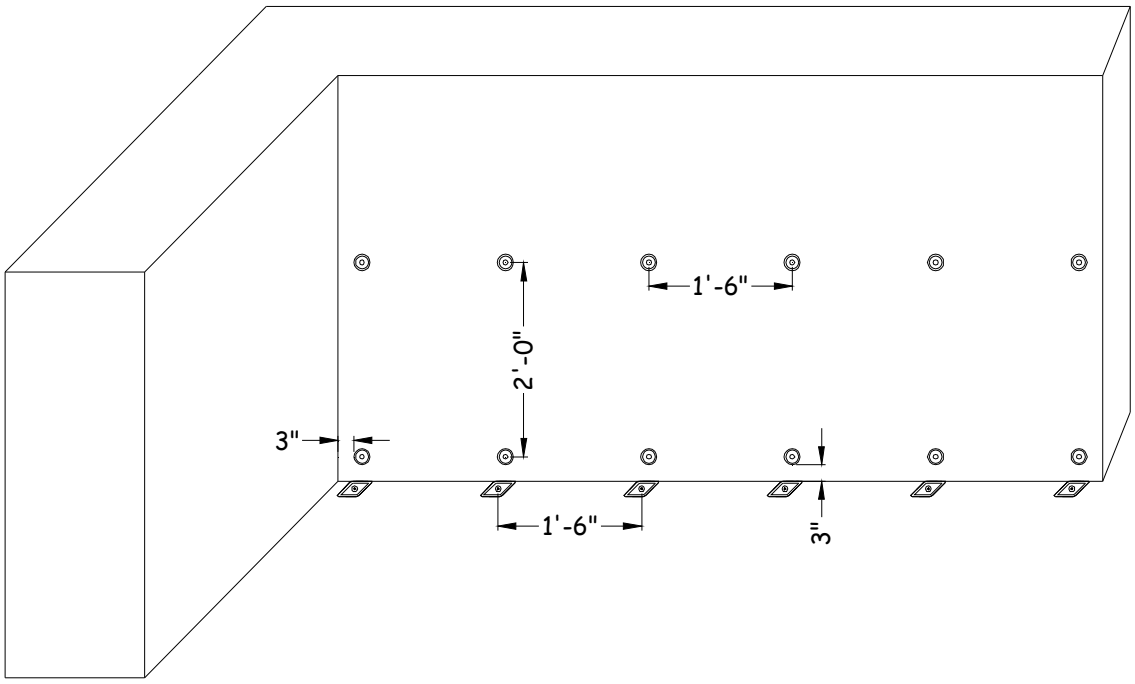
(Option 2)

Deck membrane run up the wall can be fastened 5-foot on center horizontally and 12-inches on center vertically with base flashing at 30-inches on center.



(Option 3)

When using separate roll good to flash wall, plates shall be spaced in rows 24-inches on center vertically and fastened 18-inches on center. If deck membrane is flashed up wall 6–inches then plates and fasteners are required at base of wall. Roll goods must be tack welded 18-inches on center at base. Duro-Last square metal plates can be used at base of wall.



Miscellaneous Information

- Two way air vents are required with the induction system.
- All Duro-Last membrane colors are available for use.
- Only Duro-Last # 15 Fasteners are allowed for plate attachment.
- Ordering material in 4-foot increments when possible is preferred.
- All warranties are available.
- Centrix welders can be rented and purchased through FRS Centrix. The RhinoBond welders must be purchased through OMG or their distributors.
- Training for use of the Duro-Bond system is available by contacting the Duro-Last Quality Assurance department and scheduling a training.

Acceptable Substrates

The following are the only acceptable substrates for induction welding.

- **Concrete**
- **Steel**
- **Wood**
- **Gypsum**
- **Purlins**

Acceptance of any substrate for induction welding is solely based on the pullout values obtained. All buildings in high wind zones 110 m.p.h. or above or 40’ in height or taller contact Engineering Services.

The fastening patterns are determined by pullout values and uplift pressure for the field, perimeters and corners. (See Mech. Attached Duro-Last specification pg. 5 for required pull tests.)

Pullout Value Chart

Pull out values are for **FIELD** area only. Perimeters are to be enhanced by a minimum of two plates and fasteners more than field area. Corner areas are to be enhanced by a minimum of two plates and fasteners more than perimeters. Any pull value less than 210 lbs. must contact Engineering Services Department.

(800) 248-0280 or email us at engineering@duro-last.com

40 & 50 mil

Pullout Values	Uplift pressure in lbs.										
	60	75	90	105	120	135	150	165	180	195	210
550 +	6	8	8	10	10	12	14	16	n/a	n/a	n/a
525	6	8	8	10	10	12	14	16	n/a	n/a	n/a
500	6	8	8	10	10	12	14	16	n/a	n/a	n/a
475	6	8	8	10	10	12	14	16	n/a	n/a	n/a
450	6	8	8	10	10	12	14	16	n/a	n/a	n/a
425	6	8	8	10	10	12	14	16	n/a	n/a	n/a
400	6	8	8	10	10	12	14	16	n/a	n/a	n/a
375	6	8	8	10	12	12	14	16	n/a	n/a	n/a
350	6	8	8	10	12	14	14	n/a	n/a	n/a	n/a
325	8	8	10	12	12	16	16	n/a	n/a	n/a	n/a
300	8	10	10	14	14	16	16	n/a	n/a	n/a	n/a
275	8	10	12	14	14	16	n/a	n/a	n/a	n/a	n/a
250	8	10	12	16	16	n/a	n/a	n/a	n/a	n/a	n/a
225	10	12	14	16	n/a	n/a	n/a	n/a	n/a	n/a	n/a
210	10	12	14	16	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Less than 210	Contact Engineering Services										

***Charts for use only with Concrete, Steel & Wood plank ***

For Field Area Only!

60 mil

Pullout Values	Uplift pressure in lbs.										
	60	75	90	105	120	135	150	165	180	195	210
550 +	6	6	8	8	10	10	12	12	14	14	16
525	6	6	8	8	10	10	12	12	14	14	16
500	6	6	8	8	10	10	12	12	14	14	16
475	6	6	8	8	10	10	12	12	14	14	16
450	6	6	8	8	10	10	12	14	14	16	16
425	6	8	8	10	10	12	12	14	16	16	16
400	6	8	8	10	12	12	14	14	16	16	n/a
375	6	8	10	10	12	12	14	16	16	n/a	n/a
350	6	8	10	12	12	14	14	16	n/a	n/a	n/a
325	8	10	12	12	12	14	16	n/a	n/a	n/a	n/a
300	8	10	12	14	14	16	16	n/a	n/a	n/a	n/a
275	8	12	12	14	14	16	n/a	n/a	n/a	n/a	n/a
250	10	12	12	14	16	n/a	n/a	n/a	n/a	n/a	n/a
225	10	12	14	16	n/a	n/a	n/a	n/a	n/a	n/a	n/a
210	12	14	14	16	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Less Than 210	Contact Engineering Services										

Charts for use only with Concrete, Steel & Wood plank

For Field Area Only!

Test Weld Procedure

1. Place induction plates on non-heat sensitive material such as (DensDeck, Polyisocyanurate, Securock® etc..,).
2. Place scrap piece of membrane over induction plates.
3. Adjust settings on welder to recommended settings (see page 6) for either the Centrix or RhinoBond welders.
4. Place RhinoBond welder over plates ensuring plate is centered under red circle on welder. Press start, wait for welder to stop running & beep twice. Remove welder from plate and quickly place magnet on membrane over heated plate and wait for plates to be cool to touch. DO NOT SLIDE MAGNET.
5. Place Centrix weld head over plates until LED lights indicate proper placement (center led will light up) and welder will automatically run. Once cycle is complete place magnet on plate and wait for plates to be cool to touch. DO NOT SLIDE MAGNET.
6. Grab edge of plate with pliers and membrane with second pliers and proceed to pull apart. This will tear membrane off plate revealing adhesion. (see page 7)
7. Look at top of plate to determine adhesion. Adjust settings as needed to obtain 100% adhesion. (see photos on pages 7-8)

Partial Weld

Top of the plate is partially exposed. No burn marks present. Welder time should be adjusted up and another test performed following steps 1 thru 7 until 100% adhesion is obtained. (see photo pg. 7)

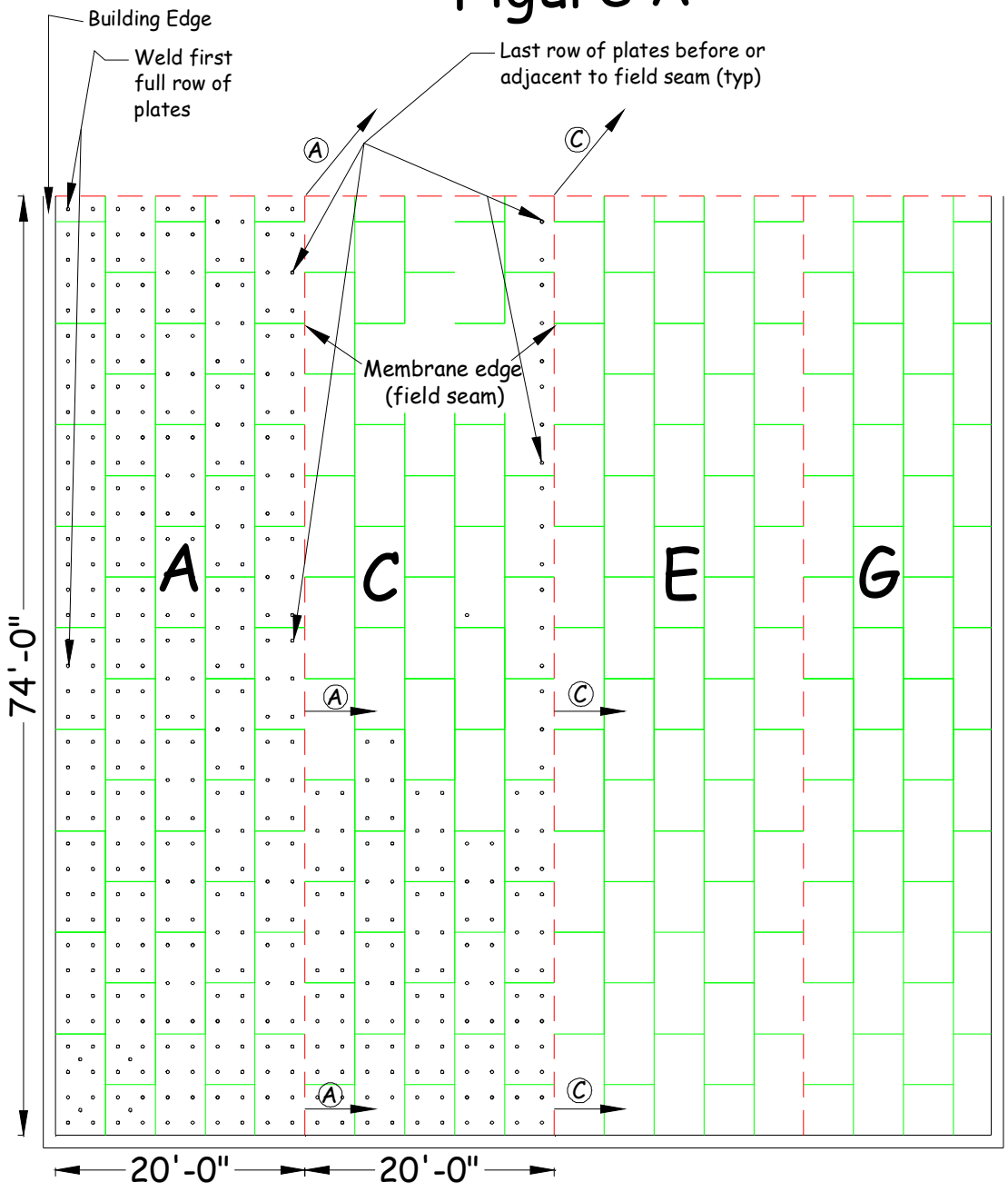
Excessive Heat (Bad Weld)

A partial weld or fully exposed plate. Black or burn marks on plate or membrane. Welder settings must be adjusted down and another weld performed following step 1 thru 7, repeat until 100% adhesion is obtained. (see photo pg. 8)

Good Weld (100% Adhesion)

Proper adhesion is achieved with bottom film on plate & exposed scrim on underside of test samples. Installation of membrane can begin. (see photo pg. 8)

Figure A



Insulation Board – – – Field weld 6-inch overlap

Duro-Bond Plates ——► Grip pull Direction

A=Start panel

C= Adjacent panel

Precautions

The Duro-Bond system uses induction welding which produces very high temperatures that can injure people and damage metal products. All members of your crew must read and understand all instructions from this manual before operating. Failure to follow the instructions in this manual can lead to serious injury, shock or even death.

Please Read the Following

1). Do not use these tools if you have a pacemaker, surgical implant, prosthesis or other medical device. These tools may interfere with their proper operation.

2). Do not engage tools over metal objects or on the floor.

3). Do not carry tools by the cords.

4). Unplug the cord before attempting to clean, service or inspect or you risk the chance of electric shock.

5). Do not activate over the power cord.

6). If cord is damaged stop using tool and contact welder manufacturer or supplier for repair.

7). Keep cord away from heat, sharp edges and any moving parts.

8). Do not allow metal objects within 3-inches of the weld head during the welding cycle.

9). Do not operate these tools under the influence of drugs, alcohol or any medication that can alter your awareness.

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